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MOTOR LOCOMOTIVES POWERED BY GAZ-AA ENGINE RUN ON KEROSENE

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Production of narrow-gauge motor locomotives by the Ministry of Building and Road-Building Machinery is necessary in order to use narrow-gauge wagons with motor-locomotive traction in asphalt and cement yards, quarries and building projects.

At present, only the Ministry of Communications produces motor locomotives for its own requirements, and their delivery to other authorities is restricted.

Our prewar experience and limited practice show that motor locomotives of 12-25 horsepower with heavy oil engines are needed. The Germans used Deitz Diesels of various powers for this purpose.

Since our industry does not yet produce Diesels of the require horsepower, Engineer Brechko's suggestion to use the GAZ-AA engine for locomotives, changing it over to kerosene, should be adopted. The proposal merits attention for the following reasons:

The GAZ-AA engine develops 50 horsepower at 2,800 rpm when running on gasoline. To run it on kerosene, the inlet and exhaust manifolds must be replaced by manifolds providing for intensive heating of the working mixture to a temperature of the order of 120-130 degrees. This modification is quite simple and can be done by a small plant.

As heating the mixture decreases the cylinder charge, the power of the engine is reduced. This does not matter since we need only 20-25 horsepower.

Trials have been performed on a similar engine in the Moscow Order of Labor Red Banner Higher Technical School imeni Bauman. The engine was fitted

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with a manifold which provided for heating of the fresh mixture by the exhaust gases. Unlike the usual GAZ-AA manifold, the second- and third-cylinder exhaust first jackets the inlet pipe and is then discharged to atmosphere.

A centrifugal governor was fitted to control the crankshaft revolutions. Battery ignition was replaced by magneto, an additional drive being provided for the latter. The distributer system and compression ratio were left unaltered.

Maximum engine power running on kerosene was 24 horsepower at 1,400 rpm.

Fuel consumption from 17 to 24 horsepower is within the limits of gasoline engine consumption, 320-330 grams per horsepower-hour. At the power mentioned, no knock was observed. The engine starts easily.

The following table shows how the engine compares with the Deitz.

	GAZ-AA	Deitz
Power	24 hp	18 hp
Rpm	1,400	1,200
Type of fuel	Kerosene	Diesel fuel
Fuel consumption	330 gram/hp-hr	220 gram/hp-hr
Dry weight	300 kg	440 kg

At the same time, before finally deciding on Engineer Brechko's proposal, the engine should be tested for wear and the amount of crankcase dilution due to fuel condensation determined.

It must be said that the mixture is heated more in this engine than in the usual kerosene engines and one would not expect much fuel condensation.

Moreover, in the GAZ-AA engine the connecting rod-crankshaft assembly is designed to work at 2,000 rpm and above, whereas in our case the rpm is not above 2,000.

Thus, the modified GAZ-AA engine is entirely suitable for a motor locomotive as regards its basic characteristics, i.e., power, fuel, ease of starting and simplicity of maintenance.

It should be added that this engine is mass produced and low priced. Spare parts are readily available.

At the same time, the industry should be set the task of manufacturing motor-locomotive Diesels for us.

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